

DEPARTMENT OF ENERGY

PROPOSED FINDING OF NO SIGNIFICANT IMPACT
SUPERCOMPACTOR AND REPACKAGING FACILITY
AND TRU WASTE SHREDDER
ROCKY FLATS PLANT, GOLDEN, COLORADO

AGENCY DEPARTMENT OF ENERGY

ACTION PROPOSED FINDING OF NO SIGNIFICANT IMPACT

SUMMARY The Department of Energy (DOE) has prepared an environmental assessment of the proposed action to construct and operate a supercompactor and repackaging facility (SARF) and a transuranic (TRU) waste shredder (TWS) in the existing Building 776 at the Rocky Flats Plant (RFP). The SARF and the TWS, respectively, would compact and shred solid plutonium-contaminated TRU wastes, including TRU wastes that contain hazardous chemical constituents. The purpose of the proposed action is to reduce waste volumes, process costs, and external radiation exposure to workers. Although the EA demonstrates that the risks associated with the proposed operation of the SARF/TWS and the storage of supercompacted wastes at RFP are low, the DOE is continuing to evaluate options to reduce risks as low as possible. For example, efforts will be implemented over the next two to three years to reduce the risk of storing supercompacted wastes to levels lower than those associated with the status quo by transferring wastes into buildings designed to withstand severe natural phenomena events, e.g., earthquakes and high winds.

The DOE issued a proposed finding of no significant impact (FONSI) on March 24, 1990, and distributed the EA and proposed FONSI for a 30-day public review period beginning on March 30, 1990, with the publication of the FONSI in the Federal Register (Vol. 55, No. 62, pp. 11997-12000). During the week of March 26, 1990, copies of the EA and FONSI were

delivered to the Governors of Colorado and New Mexico, Colorado congressional delegates, local officials, interested organizations, public reading rooms and local libraries. Additionally, advertisements explaining the opportunity to provide comment on the EA and the FONSI were published in several local newspapers. In response to a request made by the State of Colorado, the public review period was extended to May 22, 1990, notification of this extension was published in the Federal Register on May 16, 1990. In total, 154 comments were received from fourteen organizations and individuals. These comments were grouped by technical area, and a "Response to Comments on DOE/EA-0432" document was produced to accompany the EA. This document has been sent to each of the commenters, and has been made available in the Rocky Flats Public Reading Room. Of the 154 comments received, only five provided direct comment on the FONSI. In addition to being addressed in the response to comments document, a summary of the five comments and the DOE responses have been included in an attachment to this notice. As a result of the public review process, DOE has concluded that no new information has been made available that would change the determination that the proposed action does not constitute a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969, (42 U.S.C. 4321 et seq.). Therefore, at this time the DOE is prepared to finalize the proposed FONSI.

ADDRESSES AND FURTHER INFORMATION Persons requesting additional information regarding the SARF/TWS project or wishing a copy of the EA or "Response to Comments on DOE/EA-0432" document should contact

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SUPPLEMENTARY INFORMATION

BACKGROUND The Rocky Flats Plant (RFP) is a part of the national nuclear weapons research, development, and production complex administered by the DOE. As a result of nuclear weapons production activities and other programs, RFP produces plutonium-contaminated TRU radioactive wastes as well as TRU wastes that contain nonradioactive hazardous chemical constituents (TRU-mixed wastes). In the past, approximately 34,000 cubic feet (average for 1987 and 1988 fiscal years) of such wastes were repackaged annually at RFP by opening the waste drums, manually removing the packages of waste, and placing the packages of waste into a waste box. This repackaging method results in minimal volume reduction. The SARF would replace this inefficient manual process of repackaging waste from drums to waste boxes.

The Rocky Flats Plant Resource Conservation and Recovery Act (RCRA) Part B Operating Permit Applications, which define the maximum capacity of storage at the RFP under interim status, limit on-site storage of TRU-mixed wastes to a volume of 1601 cubic yards. The proposed action would compact TRU-mixed waste, and allow storage of effectively twice as much TRU-mixed waste at RFP, thereby enabling operations to continue in compliance with the RCRA requirements until alternate storage (onsite and offsite alternatives are being considered) and/or disposal sites are approved.

PROPOSED ACTION· The proposed action is to construct and operate the SARF to reduce the volume of TRU and TRU-mixed wastes and to construct and operate the TWS to shred classified graphite molds and used filters. The purpose of the proposed action is to reduce the external radiation dose to workers, reduce waste volume and process costs, and enable operations at RFP to continue in compliance with RCRA requirements. Average volume reductions of 5 to 1 and 2 to 1 are expected for wastes to be processed in the SARF and TWS, respectively. An overall volume reduction of approximately 2 to 1 would be achieved for all RFP TRU wastes, taking into account that there are certain wastes that cannot be supercompacted.

Wastes processed by the SARF and the TWS would be stored in designated storage areas in existing buildings on-site until either transferred to alternate storage site(s) or shipped to the Waste Isolation Pilot Plant (WIPP). Transportation of all supercompacted wastes would take place in double-walled steel shipping containers certified by the Nuclear Regulatory Commission (NRC), referred to as Transuranic Package Transporters (TRUPACT II). (WIPP is a mined repository in New Mexico at which the Department of Energy plans to conduct research and development to evaluate its use as a potential disposal facility for defense-related TRU and TRU mixed wastes. For a detailed discussion of transportation and operations associated with the WIPP, see the WIPP Final Supplement Environmental Impact Statement, DOE/EIS-0026-FS, January 1990.)

All drums and boxes of waste that would be treated in the SARF or the TWS would first be scanned by non-destructive assay equipment to assure that the containers do not exceed established fissile material limits. In addition, all drums to be processed in the SARF would be scanned by real time radiography equipment to assure that the containers do not contain free liquids.

Two categories of waste would be processed in the SARF soft or combustible waste, and hard or noncombustible waste. Combustible wastes include such items as paper and plastic. Noncombustible wastes include miscellaneous metals, piping, motors, glass, Raschig rings, process filters, and high efficiency particulate air (HEPA) filters. Hard wastes packaged in 35-gallon steel drums would be directly supercompacted (drum and all) into "pucks", and the pucks would be loaded into 55-gallon steel drums for final disposal. Bags of soft wastes, initially packaged in 55-gallon drums, would be unpackaged and precompacted into 35-gallon drums and then supercompacted as described above. To achieve further volume reduction, process filters and HEPA filters may also be precompacted into 35-gallon drums and then supercompacted into pucks, the same as soft wastes. Supercompaction would be achieved by a 2,200-ton hydraulic ram cylinder. Precompaction would be achieved by a 30-ton hydraulic ram cylinder. During the initial SARF operating period, an estimated maximum of approximately 15,000 cubic feet of TRU and TRU-mixed wastes would be removed from storage, repackaged, and supercompacted concurrently with the normal waste production feed to SARF.

The TWS would be used to declassify and reduce the size of graphite molds, and to shred and reduce the size of filters. The shredder would consist of two counter-rotating shafts with knives that would shred the waste materials into scraps measuring approximately 1 inch by 2 inches by 2 inches or smaller. Shredded molds would be loaded into 55-gallon drums for storage and disposal. Shredded filters would be loaded into 35-gallon drums for supercompaction.

Both the SARF and the TWS processing equipment would be operated in gloveboxes in order to limit radiological and hazardous chemical exposures to workers. The glovebox enclosures would be maintained under negative air pressure, relative to the air pressure within

the surrounding room. Air effluents from the gloveboxes would be filtered through four stages of HEPA air filters before being discharged to the atmosphere through rooftop vents. The air in the room surrounding the gloveboxes and the air being discharged to the atmosphere would be continuously monitored to detect increases in airborne alpha radiation. If alpha radiation were detected in concentrations exceeding 0.02 picocuries/cubic meter, an investigation will be conducted to determine the cause(s) and the corrective action that will be taken.

Numerous control measures have been included in the design and operating procedures for the SARF and the TWS to mitigate and control potential nonroutine hazards. Both the SARF and the TWS gloveboxes would contain fire prevention, detection, and suppression systems. Nuclear criticality controls would be implemented to limit the plutonium content in the wastes and to establish standard procedures that would eliminate the potential for a nuclear criticality incident. Prior to and during waste treatment in the SARF and the TWS, wastes would be segregated to avoid mixing of incompatible wastes. In order to prevent TRU waste from becoming contaminated by TRU-mixed waste, cleaning procedures would be used to decontaminate both the SARF and the TWS treatment equipment whenever a batch of TRU waste was to be treated after a batch of TRU-mixed waste. In order to mitigate the potential for gas buildup in drums of supercompacted waste, the drums would be equipped with carbon composite filters to permit venting of the gas while retaining radioactive materials.

Although the EA demonstrates that the risks associated with the proposed operation of the SARF/TWS and the storage of supercompacted waste are low, the DOE is continuing to evaluate all possible options to reduce the risks to the lowest possible levels. For example, efforts will be implemented over the next two to three year period to reduce the risk of storing supercompacted wastes to levels lower than those associated with the status quo by transferring

wastes into buildings designed to withstand severe natural phenomena events, e g , earthquakes and extreme winds

ALTERNATIVES CONSIDERED Alternatives to the proposed action that were discussed in the EA included the no action alternative, the repackaging line and in-drum compactor alternative, and the no treatment alternative

Under the no action alternative (i e , current operations), wastes would continue to be manually repackaged from drums into standard waste boxes. The no action alternative would require three workers to continue using supplied air suits during normal operations, which is contrary to the DOE policy to reduce radiation exposures to levels as-low-as-reasonably-achievable (ALARA) and to a RFP directive to implement ALARA by eliminating routine operations which require use of supplied breathing air. Although much less efficient than the proposed action, continued operations would provide minimal volume reduction and a more efficient method of waste handling than the no treatment alternative (see below)

The repackaging line and in-drum compactor alternative would reduce the volume of soft wastes by shredding and compaction (not supercompaction) of the wastes into 55-gallon drums. The in-drum compactor would achieve a soft waste volume reduction of approximately 3 to 1. With this alternative, hard wastes would continue to be manually repackaged.

Under the no treatment alternative, drums of TRU and TRU-mixed wastes would be prepared by the RFP generator for direct shipment to storage and/or off-site disposal. There would be no volume reduction and an increase in the number of waste containers relative to any other alternative.

ENVIRONMENTAL CONSIDERATIONS. Since the SARF and the TWS treatment equipment would be operated inside gloveboxes located inside the existing Building 776, there would be no direct construction-related impacts to wetlands, threatened or endangered species, or historical resources. Routine operation of the SARF and TWS would create no detectable increases in radioactive or non-radioactive emissions to the existing environment, and would not affect continued compliance with the Clean Air Act. The proposed action would create no wastewater effluents or discharges and would not affect compliance with the Clean Water Act. Operations of the SARF/TWS and storage of supercompacted TRU-mixed wastes would be consistent with the interim status change requested under RCRA in November 1989.

Routine Operations. Analyses were conducted to assess worker and public exposures to radiation and hazardous chemicals during both routine operations and potential accidents. Routine operation of the SARF and the TWS was estimated to result in a combined maximum radiation dose to a member of the public of 2×10^{-11} rem/year committed effective dose equivalent (CEDE), which is approximately one billionth of that permitted under applicable limits established by the Environmental Protection Agency (10 mrem/year from airborne pathways). Assuming the same workers would operate both the SARF and the TWS, the average annual exposure to each worker was estimated to be approximately 0.9 rem or about 20 percent of the applicable DOE limit (5 rem-effective dose equivalent), which would be a reduction in exposure relative to the no action alternative.

Risks from Abnormal Events. A range of potential accidents was considered in the EA based on preliminary design characteristics and a knowledge of existing DOE plutonium operations. By using conservative assumptions (i.e., those that tend to overestimate potential impacts), the EA attempted to bound all reasonably foreseeable adverse impacts of the proposed action.

Principal exposure pathways are external radiation and potential uptake of radioactive material by inhalation of respirable particles. Exposures were calculated for maximally exposed individual (MI) members of the public and the RFP workforce as well as to the projected population living within a 50-mile radius of RFP in the year 2008 (2,916,000 people). The MI is a hypothetical offsite individual, usually located at or not far from the RFP boundary, in a location of maximum possible exposure as determined by the AIRDOS-EPA computer code.

To lend further perspective, the accident calculations were also made under two sets of meteorological conditions defined as representative and unfavorable. The representative analyses incorporated atmospheric conditions (e.g., wind speed and direction) representative of prevailing conditions at RFP, while the unfavorable analyses utilized conservative assumptions to provide an upper estimate of potential impacts. The unfavorable conditions will have a lower probability of occurrence than that for representative conditions.

Accident Scenarios A suite of accidents was analyzed to estimate potential radiological exposures to workers and the general public: (1) a criticality, (2) a fire on a loading dock, (3) a waste bag rupture at a glovebox airlock, (4) a breach of a drum on a loading dock, (5) a design basis earthquake, and (6) a design basis wind (DBW). Hypothetical exposures to the MI member of the public ranged from 4.6×10^{-9} to 5.8×10^{-1} rem CEDE and from 4.9×10^{-8} to 1.4×10^2 rem CEDE for representative and unfavorable meteorological conditions, respectively. The highest potential exposures to the public would be associated with the fire on the loading dock for representative conditions and with the DBW scenario for the unfavorable conditions. (It should be noted that the actual risks associated with the temporary staging of supercompacted wastes on the loading dock would not increase relative to current operations because administrative controls would be implemented to limit the amount of radioactivity at

risk in the loading dock to existing levels) The population exposure was estimated to be highest under both sets of meteorological conditions for the DBW scenario, with a calculated projection of 6 to 109 excess latent cancer fatalities (LCFs) The calculated LCFs must be viewed in conjunction with the low probability (10^{-4} /year) of occurrence of the DBW

Maximum individual occupational exposures were calculated for the accident scenarios Potential exposures (excluding that from a criticality accident, as discussed below) were calculated to range from 0.02 to 55 rem CEDE The highest exposure is associated with the fire on the dock scenario Exposures in the dock fire scenario are assumed to occur during the initial stages of the fire before evacuation could take place and would be incurred by a small number of workers in the immediate area Exposures from the dock fire (and all other DBAs) would not result in any prompt fatalities and are unlikely to produce any LCFs

Regarding a potential criticality accident, reaching a critical mass of plutonium in the supercompactor or a supercompacted waste drum would require multiple violations of operating procedures and controls, and, therefore, is considered to be an extremely unlikely occurrence However, because it is not possible to entirely rule out such an event, it was analyzed in the EA Depending on their proximity to the accident, workers could suffer lethal radiation exposure However, the actual risks associated with this scenario are very small due to the unlikely probability of occurrence In more than thirty-five years of operations at RFP no criticality accident has been experienced

Severe Accident An accident postulating an aircraft crash into the SARF/TWS facilities and/or any of the buildings proposed to store supercompacted waste was analyzed in the EA The crash was assumed to result in a fire and release of radioactivity to the environment and was based, in

part, on analyses conducted for the 1980 Rocky Flats Plant Final Environmental Impact Statement (FEIS). The scenario takes into account the probabilities of an aircraft crash at the RFP, the penetrability of walls/barriers of storage buildings, the ratio of the waste storage areas to the total area within a building, and assumes that storage areas are at full capacity of supercompacted waste. The annual probability of release from any waste storage area was estimated to be approximately 1.2×10^{-7} , ranging from 1.1×10^{-8} to 3.2×10^{-8} for each of the five storage areas for TRU-mixed waste. The associated incremental population exposure (i.e., compared to exposures associated with storage of uncompacted wastes) ranges from 1.7×10^4 to 1.5×10^6 person-rem (5 to 420 LCFs), depending on the storage area involved and meteorological conditions existing at the time of the accident.

Hazardous Chemical Analyses Risk analysis was also conducted to determine the predicted cumulative cancer risk to the public at the site boundary due to hazardous chemical emissions from the routine operation of SARF and TWS. The predicted cumulative cancer risk was less than one chance in one million. Hazardous chemical exposures from accidents associated with the proposed action were predicted to result in insignificant hazardous chemical impacts to an individual located at the site boundary. Because the SARF and the TWS would be operated in gloveboxes and other safety features would be implemented, there should be no opportunity for workers to come in physical contact with any hazardous materials during routine operations, thereby minimizing occupational exposures to hazardous chemicals. Impacts to workers from potential accidental releases of hazardous materials were also evaluated and determined to be insignificant.

Transportation and Disposal. Transportation and disposal impacts of wastes treated by the SARF and the TWS were discussed and analyzed in the Supplemental Environmental Impact Statement for the Waste Isolation Pilot Plant (DOE/EIS-0026-FS, January 1990). Supercompaction would result in decreased waste volumes, increased waste densities, and therefore less waste volume transported and disposed. Although more radioactivity could be shipped per shipment, greater densities and the packaging of the wastes as pucks inside 55-gallon drums would result in additional self-shielding of radiation as well as an additional barrier during potential transportation accidents. As previously discussed, the SARF and TWS treated wastes would be shipped in double walled steel TRUPACT II containers licensed by the NRC that meet all applicable Department of Transportation safety regulations. Wastes processed through the SARF/TWS would pose no unusual transportation and handling risks or preclude any alternatives bearing on the long-term performance of the WIPP.

In comparing the environmental impacts resulting from the proposed action and the alternatives, neither the proposed action nor any alternative was found to result in significant adverse impacts. The proposed action was predicted to result in beneficial impacts due to waste volume reductions which would decrease waste transportation and disposal volumes.

PROPOSED DETERMINATION Based on the information and analyses in the EA, DOE believes the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment, within the meaning of NEPA. Therefore, DOE proposes that preparation of an environmental impact statement is not required.

ATTACHMENT

Summary of Comments Received on the Proposed FONSI

A total of 14 commenters submitted comments on the proposed FONSI and the supporting EA during the public review and comment period from March 3 to May 22, 1990. Although the comments raised questions concerning the proposed action, no significant new information having a bearing on environmental concerns was presented which affected the DOE's proposed NEPA determination. Those comments that were specific to the proposed FONSI and the DOE's responses to those comments follow:

Comment. Page 3 of the FONSI confirms suspicions that the SARF is simply a short term emergency solution to avoid surpassing the 1601 cubic yard limitation imposed by the Colorado Department of Health (CDH). The FONSI admits to needing the SARF to continue operations while complying with RCRA.

Response. The proposed action will increase the density and reduce the volume of TRU and TRU-mixed wastes stored at the Rocky Flats Plant site. This increase in density and volume reduction will enable continued compliance with the 1601 cubic yard limitation. The Department of Energy will continue to comply with both the spirit and the intent of the volumetric storage limit.

Comment. Page 6 of the FONSI states that effluent from the gloveboxes would be filtered and then discharged to the atmosphere. The FONSI fails to address the composition of the effluent and the amount of that effluent. A finding of no significant impact should assess exactly what is being discharged and why that discharge has no significant impact. As stated in my comments on the EA, an alarm will sound if alpha radiation is detected above a limit, but the FONSI fails to state what the contingency plan is during the time between the sounding of the alarm and the implementation of the correct action. Specifically, does the operation cease until the cause is found?

Response. High Efficiency Particulate Air (HEPA) filters will be operated to reduce particulate emissions to not more than 0.02 pCi/m³. Continuous monitoring will confirm the safe concentrations of particulates, americium and plutonium.

The maximum releases of hazardous chemicals to the environment are as follows:

1,1,1-trichloroethane	0.15 tons
Carbon tetrachloride	0.06 tons
1,1,2-trichloro-1,2,2-trifluoroethane	0.01 tons
Methylene chloride	0.06 tons
Lead	3.60×10^{-7} tons
Mercury	9.78×10^{-12} tons

If emissions of non-specific alpha emitters exceed 0.02 pCi/m², an investigation will be conducted to determine the cause(s) and the corrective action that will be taken. There is no immediate or long-term health hazard at a release level of 0.02 pCi/m³. For example, 0.02 pCi/m³ is more than one hundred times lower than the most restrictive Derived Air Concentration (DAC) proposed by the International Commission on Radiological Protection (ICRP), without considering the dilution that will occur when the material leaves the vent and is dispersed in the surrounding air. If there is a potential health risk, the necessary operations will be shut down until the problems are corrected.

Comment. Page 6 also states that drums of supercompacted waste will have carbon composite filters for venting of gas. Will the filtered effluent gas cause any significant impact? What is the composition of the effluent filtered gas?

Response. There is not expected to be sufficient carbon dioxide or hydrogen gas generation from supercompacted waste to cause any significant impact. The carbon composite filter would retain radioactive material.

Comment. Page 8 of the FONSI states that the SARF and TWS would create no detectable increases in emissions to the environment. The EA did assess the risks to the public and the workers, so there must be some increase in emissions for the public and workers to be at some increased risk. In fact, pages 7 & 8 of the FONSI admit that there is some increased exposure from the routine operation of the proposed action.

Response. Page 8 of the proposed FONSI states that routine operation of SARF and TWS was estimated to result in a combined maximum radiation dose to a member of the public of approximately one billionth of that permitted under applicable limits. This radiation dose is not detectable. Page 7 does not discuss risk from routine operations, but from postulated accidents.

Comment. Page 11 goes to great lengths to point out that criticality is unlikely and that it has never occurred at the RFP. As stated in my comments supra, was not the 1957 and 1969 fires the result of criticality or aggravated by criticality as a result of the fire fighting efforts? Criticality does not seem as unlikely as the FONSI would have us believe.

Response: Neither fire was the result of a criticality situation and even though water was used on burning plutonium for the first time in the 1969 fire, its use did not create a nuclear criticality. The September 11, 1957, fire started in a can of plutonium casting residue in processing Building 771. The May 11, 1969, fire was reported as a result of spontaneous ignition of a 1.5 kilogram briquette of scrap plutonium alloy in an open metal can.

SARF AND TWS ENVIRONMENTAL ASSESSMENT

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